

REMARKS

Claims 39, 40, 21, 41, 22, 43, 24, 58, 59, 64, 60, 65, 62 and 67 - 73 were rejected under 35 U.S. C. 102(b) as being anticipated by Shepherd et al.

Only independent claims 39, 41, 43, 58, 60 and 62 are amended herein. New claim 74 has been added. The same amendment has been made in claims 39, 41 and 43. A similar amendment has been made in claims 58, 60 and 62. The amendments may be found in the last paragraph of claims 39 and 58 and in the next to last paragraph of claims 41, 43, 60 and 62. Specific support for these amendments is discussed below.

Claims 39, 41, 43 have been amended, by adding the underlined portions, to state:

"...the number of allocated time slots in each logical channel being a function of one of a symmetry and an asymmetry of the packet data transmission, the total number of allocated time slots for said mobile station being an even or odd number;..."

Claims 58, 60, 62 have been amended, by adding the underlined portions, in a similar manner to state:

"...in dependence upon the demand for packet data transmission in the uplink direction and respectively upon the demand for packet data transmission in the

downlink direction, the total number of allocated time slots for said mobile station being an even or odd number."

It is respectfully submitted that Shepherd et al. does not disclose or suggest Applicants' invention as set forth in claims 39, 41, 43, 58, 60 and 62.

In Shepherd, duplex voice channels are allocated comprising a pair of non-adjacent time slots for effecting a data transaction (see the abstract, lines 1-6). Thus, even if one would say that in Shepherd there would be allocated an asymmetric number of time slots (because under-utilized times slots in one direction can be released for other unidirectional signaling), nevertheless, Shepherd always has allocated for each channel in the uplink and downlink direction an equal number of time slots.

Thus Shepherd fails to teach the feature of the present independent claims discussed above.

It is apparent that Shepherd and the present invention both reserve channels, (called the logical channels) in the present invention. However, in Shepherd a channel reservation or allocation always means allocating a pair of non-adjacent time slots, one in the uplink and one in the downlink for each duplex channel. The present invention, however, allocates channels where the uplink logical channel can have a different (unequal) number of time slots than the downlink logical channel. This makes channel allocation dynamic and provides a

more effective usage of capacity than Shepherd, which always reserves pairs of time slots. Thus, the present invention provides the advantage of a more efficient and effective use of the available radio frequency spectrum. It has advantages which Shepherd simply does not achieve.

More specifically, and with reference to the attached explanatory drawing submitted herewith, all of the independent claims amended herein specifically define both an uplink TDMA frame and a downlink TDMA frame. Shepherd only has a single frame of 24 time slots, of which the 12 first time slots F1 to F12 are allocated for forward transmission and the second twelve time slots R1 to R12 are allocated for transmission in the reverse direction. Shepherd clearly fails to teach having a separate uplink TDMA frame and separate downlink TDMA frame. On this basis alone, these claims are not anticipated by Shepherd, since Shepherd only has one single frame with certain time slots used for uplink and other time slots used for downlink.

This difference has an extremely significant effect on the effectiveness and thus on the capacity of the system. This is illustrated in an attached figure. Since the present invention has a separate uplink TDMA frame (of 8 time slots) and separate downlink TDMA frame (of 8 time slots), it is clearly more efficient. Specifically, within the same time the mobile station can transmit an uplink time slot four times, and three downlink time slots four times, when it is assumed that it has allocated one time slot for uplink transmission and three time slots for downlink transmission. This is due to the fact that the uplink and downlink frames are typically a bit overlapping

as also shown in Figs. 7, 9 and 10 of the present application.

Using up the same time in Shepherd, and assuming that there would also be in the Shepherd single frame system 8 time slots for uplink and 8 time slots for downlink, the attached figure clearly illustrates that the Shepherd system is less efficient. Specifically, during the same time the mobile station would only transmit the one uplink time slot twice and the three downlink time slots twice. Therefore the system of the present invention is roughly 100 per cent more efficient, and the capacity is therefore about double that when compared to the Shepherd transmission capacity during the same time.

As noted above, this difference is extremely significant, and thus the present invention is clearly not anticipated or rendered obvious by Shepherd et al.

Thus, it is respectfully submitted that Applicants' invention, as set forth in claims 39, 41, 43, 58, 60 and 62 is patentably distinguishable from Shepherd et al. Allowance of these claims is respectfully requested.

Claims 21, 22, 24, 59, 65 and 67 depend from these claims respectively. Claim 40 depends from independent claim 39, while claim 64 depends from independent claim 58. For the reasons set forth above, it is respectfully submitted that these claims are also directed to patentable subject matter.

With respect to claims 68-73 it seems that the Examiner is arguing that Shepherd teaches "reserving a logical channel

only in one direction at a time". The fact that one under-utilised time slot is released and made available for other unidirectional signalling does not make Shepherd reserve a logical channel only in one direction at a time, since before releasing and making available an underutilized channel Shepherd reserves a duplex channel. i.e. in two directions at a time.

This also makes the system of Shepherd more complicated since in Shepherd the system must monitor the duplex voice channels and detect the absence of signals to detect underutilized time slots (see col. 3, lines 36-42 of Shepherd) and then release such time slots and make them available for other unidirectional signaling. The present system is simpler in that there is always allocated only the exact number of time slots that the mobile station needs. Therefore there is no need to put monitoring and detection in place for each channel in order to find underutilized time slots, and basically no under-utilization exists in the system of the present invention. As described in col. 3, lines 20-35 of Shepherd there under-utilized time slots will be reversed, and thus will be used for the same mobile station. Therefore if the mobile station is not able to utilize the under-utilized time slot even for the reverse direction then that time slot remains unused, but still reserved. Thus, as explained in col. 3, lines 55-57 of Shepherd, it is only once the data transaction is completed that the assigned duplex voice channels are made available to other users. Accordingly the system of Shepherd clearly wastes resources.

For example assuming that the mobile station has a need for

one (1) uplink time slot and two (2) downlink time slots. In Shepherd the mobile station then reserves duplex voice channels with two (2) uplink time slots and two (2) downlink time slots. In this situation reversing of the one underutilized uplink time channel does not help since the mobile station has no use for it, because it only needs two downlink time slots. Also, clearly Shepherd teaches that only duplex voice channels are made available to other users, and therefore the one uplink time slot remains unused since the mobile station has no use for it, and it can not be released for other users. Nothing in Shepherd teaches releasing and making available a single time slot for other users.

The releasing of a time slot is also illustrated in the attached figure with the light-grey time slots. Accordingly to provide one time slot in the uplink and three time slots in the downlink for a mobile station, according to the attached figure, in the Shepherd system there is reserved a duplex channel, i.e. there is reserved at the same time three time slots in the uplink direction and three time slots in the downlink direction. Then, after this, the two reserved light-grey time slots can be released and made available for other unidirectional signaling of the same mobile station (should it have such). If not, then the light-grey time slots remain reserved but unused.

It is thus submitted that claims 68 - 73 are also directed to patentable subject matter.

Newly added claim 74 is added to make it explicitly clear that there are times when the number of allocated time slots for the mobile station is an odd number of time slots. As noted above, this is clearly not the case for Shepherd et al., where this would simply be impossible. For the reasons set forth above, it is respectfully submitted that claim 74 is also directed to patentable subject matter.

Conclusion

As seen from the above explanation, there is clearly a difference in the number of time slots being reserved. So in total, one mobile station of Shepherd always reserves duplex channels whereby the total number of reserved time slots by a single mobile station in Shepherd is always an even number, whereas in the present invention the total number of reserved time slots can be odd or even, as specifically set forth in the independent claims amended herein.

This difference clearly makes the system of the present invention more efficient as every time slot can be utilized, whereas in Shepherd there can occur situations where there remain unused time slots, e.g. as explained above when the mobile only needs 3 time slots (1 uplink + 2 downlink) but still 4 time slots are reserved (2 + 2). This is because in Shepherd the total number of time slots reserved for one mobile station is always an even number, and never an odd number, which is possible in the present invention.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present are clearly novel and patentable over the prior art of record. Accordingly, favorable reconsideration and allowance are respectfully requested. Should any unresolved issue remain, the Examiner is invited to call Applicants' Attorney at the telephone number indicated below.

Applicants petition for an extension of time of two months in which to respond to the office action. Please charge deposit account number 16-1350 for the required fee of \$408 to cover this fee and the fee for one additional claim submitted herein. A duplicate of this page is enclosed.

Respectfully submitted,

David Aker

MAY 7, 2001

David Aker (Reg. No. 29,277)
PERMAN & GREEN, LLP
425 Post Road
Fairfield, CT 06430
(203) 259-1800
Customer No. 2512

Date

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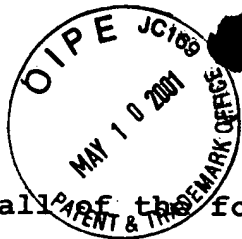
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David Aker

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David Aker (Reg. No. 29,277)
PERMAN & GREEN, LLP
425 Post Road
Fairfield, CT 06430
(203) 259-1800
Customer No. 2512

Date

907.119
(X) Mr. Steckler

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